

Job Outlook

Employment of coin, vending, and amusement machine servicers and repairers is expected to grow about as fast as the average for all occupations through the year 2008, because of the increasing number of vending and amusement machines in operation.

Establishments are likely to install additional vending machines in industrial plants, hospitals, stores, and other business establishments, to meet the public demand for inexpensive snacks and other food items. The range of products dispensed by machine is expected to increase, as vending machines continue to become increasingly automated and machines are built that include microwave ovens, mini-refrigerators, and freezers. In addition, casinos, arcades, and other amusement establishments are an increasing source of entertainment for baby boomers and young adults. Also, State and multi-State lotteries are increasingly using coin-operated machines, to sell scratch-off tickets in grocery stores and other public places.

Improved technology in newer machines will moderate employment growth, because these machines require maintenance less frequently than older ones. These new machines will need repairing and restocking less often, and contain computers that record sales and inventory data, reducing the amount of time-consuming paperwork. Additionally, some new machines use wireless data transmitters to signal the vending machine company, when these machines need restocking or repairing. This allows servicers and repairers to be dispatched only when needed, instead of their having to check each machine on a regular schedule.

Experienced workers who transfer to other occupations or leave the labor force will create job openings. Persons with some background in electronics should have good job prospects, because electronic circuitry is an important component of vending and amusement machines. If firms cannot find trained or experienced workers for these jobs, they are likely to train qualified route drivers or hire inexperienced people who have acquired some mechanical, electrical, or electronic training by taking high school or vocational courses.

Earnings

Median hourly earnings of coin, vending, and amusement machine servicers and repairers were \$11.18 in 1998. The middle 50 percent earned between \$8.73 and \$13.83 an hour. The lowest 10 percent earned less than \$6.80 and the highest 10 percent earned more than \$16.56 an hour. Typically, States with some form of legalized gaming have the highest wages.

Most coin, vending, and amusement machine servicers and repairers work 8 hours a day, 5 days a week and receive premium pay for overtime. Some union contracts stipulate higher pay for night work and for emergency repair jobs on weekends and holidays than for regular hours. Some vending machine repairers and servicers are members of the International Brotherhood of Teamsters.

Related Occupations

Other workers who repair equipment with electrical and electronic components include home appliance and power tool repairers, electronic equipment repairers, and general maintenance mechanics.

Sources of Additional Information

Information on job opportunities in this field can be obtained from local vending machine firms and local offices of your State employment service. For general information on vending machine repair, write to:

☛ National Automatic Merchandising Association, 20 N. Wacker Dr., Suite 3500, Chicago, IL 60606-3102.

Internet: <http://www.vending.org>

☛ American Vending Sales, Inc., 750 Morse Ave., Elk Grove Village, IL 60007.

Diesel Mechanics and Service Technicians

(O*NET 85311A)

Significant Points

- A career as a diesel mechanic or service technician offers relatively high wages and the challenge of skilled repair work.
- Opportunities are expected to be good for persons who complete formal training programs.
- National certification is the recognized standard of achievement for diesel mechanics and service technicians.

Nature of the Work

The diesel engine is the workhorse powering the Nation's heavy vehicles and equipment, because it delivers more power per unit of fuel and is more durable than its gasoline-burning counterpart.

Diesel mechanics and service technicians repair and maintain the diesel engines that power transportation equipment, such as heavy trucks, buses, and locomotives. Some diesel mechanics and technicians also work on bulldozers, cranes, road graders, farm tractors, and combines; and a small number repair automobiles or boats. (For information on mechanics and technicians working primarily on automobiles, heavy equipment, or boats, see the *Handbook* statements on automotive, mobile heavy equipment, or motorcycle, boat, and small-engine mechanics.)

Mechanics and technicians who work for organizations that maintain their own vehicles spend most of their time doing preventive maintenance, to ensure that equipment can be operated safely. These workers also eliminate unnecessary wear and damage to parts that could result in costly breakdowns. During a routine maintenance check on a vehicle, technicians follow a checklist that includes the inspection of brake systems, steering mechanisms, wheel bearings, and other important parts. Following an inspection, technicians usually repair or adjust parts that do not work properly and replace parts that cannot be fixed.

In many shops, it is common for workers to do all kinds of repairs. Jobs can vary from working on a vehicle's electrical system one day, to doing major engine repairs the next. In some large shops, technicians specialize in one or two types of work. For example, a shop may have technicians specializing in major engine repair, transmission work, electrical systems, suspension, or brake systems. Diesel maintenance is becoming increasingly complex, as more electronic components are used to control engine operation. In modern shops, diesel mechanics and service technicians use handheld computers to diagnose problems and to adjust engine functions.

Diesel mechanics and service technicians use a variety of tools in their work, including power tools, such as pneumatic wrenches to remove bolts quickly; machine tools, like lathes and grinding machines to rebuild brakes; welding and flame-cutting equipment to remove and repair exhaust systems; and jacks and hoists to lift and move large parts. Common handtools—screwdrivers, pliers, and wrenches—are used to work on small parts and get at hard-to-reach places. Diesel mechanics and service technicians also use a variety of computerized testing equipment to pinpoint and analyze malfunctions in electrical systems and engines.

In large shops, technicians generally receive their assignments from shop supervisors or service managers. Most supervisors and managers are experienced technicians who also assist in diagnosing problems and maintaining quality standards. Technicians may work as a team or be assisted by an apprentice or helper, when doing heavy work, such as removing engines and transmissions.

Working Conditions

Diesel mechanics and service technicians usually work indoors, although they occasionally make repairs to vehicles on the road. Diesel mechanics and service technicians lift heavy parts and tools, handle greasy and dirty parts, and stand or lie in awkward positions to repair vehicles and equipment. Minor cuts, burns, and bruises are common, although serious accidents can usually be avoided, if the shop is kept clean and orderly and safety procedures are followed. Mechanics and technicians normally work in well-lighted, heated, and ventilated areas, however, some shops are drafty and noisy. Many employers provide lockers and shower facilities.

Employment

Diesel mechanics and service technicians held about 255,000 jobs in 1998. Nearly 25 percent serviced trucks and other diesel-powered equipment for customers of vehicle and equipment dealers, leasing companies, or independent automotive repair shops. About 20 percent worked for local and long-distance trucking companies, and another 20 percent maintained the buses and trucks of buslines, public transit companies, school systems, or Federal, State, and local governments. The remaining mechanics and technicians maintained the fleets of trucks and other equipment for manufacturing, construction, or other companies. A relatively small number were self-employed. Nearly every section of the country employs diesel mechanics and service technicians, although most work in towns and cities where trucking companies, bus lines, and other fleet owners have large operations.



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Training, Other Qualifications, and Advancement

Although many persons qualify for diesel mechanic and service technician jobs through years of on-the-job training, authorities recommend the completion of a formal diesel engine training program after graduating from high school. Employers prefer to hire graduates of formal training programs, because of these workers' head start in training and their ability to quickly advance to the journey mechanic level.

Many community colleges and trade and vocational schools offer programs in diesel repair. These 6-month to 2-year programs lead to a certificate of completion or an associate degree. Programs vary in the degree of hands-on training they provide on equipment. Some offer about 30 hours per week on equipment, whereas others offer more lab or classroom instruction. Training provides a foundation in the latest diesel technology and instruction in the service and repair of the vehicles and equipment mechanics and technicians will encounter on the job. These programs also improve the skills needed to interpret technical manuals and communicate with coworkers and customers. Increasingly, employers are working closely with training programs, providing instructors with the latest equipment, techniques, and tools and offering jobs to graduates.

Whereas most employers prefer to hire persons who have completed formal training programs, some mechanics and technicians continue to learn their skills on the job. Unskilled beginners are usually assigned tasks such as cleaning parts, fueling and lubricating vehicles, and driving vehicles into and out of the shop. Beginners are usually promoted to trainee mechanic positions, as they gain experience and as vacancies become available. In some shops, beginners who have experience in automobile service start as trainee mechanics.

Most trainee mechanics perform routine service tasks and make minor repairs after a few months' experience. These workers advance to increasingly difficult jobs, as they prove their ability and competence. After mechanics and technicians master the repair and service of diesel engines, they learn to work on related components, such as brakes, transmissions, and electrical systems. Generally, a technician with at least 3 to 4 years of on-the-job experience will qualify as a journey-level diesel truck or bus mechanic. Completion of a formal training program speeds advancement to the journey level.

For unskilled entry level jobs, employers usually look for applicants who have mechanical aptitude and strong problem solving skills, and who are at least 18 years of age and in good physical condition. Nearly all employers require completion of high school. Courses in automotive repair, electronics, English, mathematics, and physics provide a strong educational background for a career as a diesel mechanic or service technician. A State commercial driver's license is needed to test drive trucks or buses on public roads. Practical experience in automobile repair in a gasoline service station, in the Armed Forces, or as a hobby is also valuable.

Employers often send experienced mechanics and technicians to special training classes conducted by manufacturers and vendors where workers learn the latest technology and repair techniques. Technicians constantly receive updated technical manuals and service procedures outlining changes in techniques and standards for repair. It is essential for technicians to read, interpret, and comprehend service manuals, in order to keep abreast of engineering changes.

Voluntary certification by the National Institute for Automotive Service Excellence (ASE) is recognized as the standard of achievement for diesel mechanics and service technicians. Technicians may be certified as Master Heavy-Duty Truck technicians or in one or more of six different areas of heavy-duty truck repair: Brakes, gasoline engines, diesel engines, drive trains, electrical systems, and suspension and steering. For certification in each area, a technician must pass one or more of the exams and present proof of 2 years of relevant hands-on work experience. Two years of relevant formal training from a high school, vocational or trade school, or community or junior college program may be substituted for up to 1 year of the work experience requirement. To remain certified, technicians must retest every 5 years. This ensures that mechanics and service technicians keep up with changing technology.

A diesel mechanic and service technician may opt for ASE certification as a school bus technician. The certification identifies and recognizes those technicians who possess the knowledge and skills required to diagnose, service, and repair different subsystems of Type A, B, C, and D school buses. The ASE School Bus Technician Test Series includes seven certification exams: Body Systems and Special Equipment (S1), Diesel Engines (S2), Drive Train (S3), Brakes (S4), Suspension and Steering (S5), Electrical/Electronic Systems (S6), and Air Conditioning Systems and Controls (S7). Whereas several of these tests parallel existing ASE truck tests, each one is designed to test knowledge of systems specific to school buses. In order to become ASE certified in school bus repair, technicians must pass one or more of the exams and present proof of 2 years of relevant hands-on work experience. Technicians who pass tests S1 through S6, become ASE-Certified Master School Bus Technicians.

The most important work possessions of mechanics and technicians are their handtools. Mechanics and technicians usually provide their own tools, and many experienced workers have thousands of dollars invested in them. Employers typically furnish expensive power tools, computerized engine analyzers, and other diagnostic equipment; but hand tools are ordinarily accumulated with experience.

Experienced mechanics and technicians with leadership ability may advance to shop supervisors or service managers. Mechanics and technicians with sales ability sometimes become sales representatives. Some open their own repair shops.

Job Outlook

Employment of diesel mechanics and service technicians is expected to increase about as fast as the average for all occupations through the year 2008. Besides employment growth, opportunities will be created by the need to replace those who retire or transfer to other occupations.

Employment of diesel mechanics and service technicians is expected to grow, as freight transportation by truck increases. Additional trucks will be needed for both local and intercity hauling, due to increased production of goods. Due to the greater durability and economy of the diesel engine relative to the gasoline engine, buses and trucks of all sizes are expected to be increasingly powered by diesels. This will create new jobs for diesel mechanics and service technicians.

Careers as diesel mechanics and service technicians attract many, because of the relatively high wages and the challenge of skilled repair work. Opportunities should be good for persons who complete formal training in diesel mechanics at community and junior colleges and vocational and technical schools, but others without formal training may face competition for entry-level jobs.

Most persons entering this occupation can expect steady work, because changes in economic conditions have little effect on the diesel repair business. During a financial downturn, however, some employers may be reluctant to hire new workers.

Earnings

Median hourly earnings of bus and truck mechanics and diesel engine specialists, including incentive pay, were \$14.11 in 1998. The middle 50 percent earned between \$11.32 and \$17.55 an hour. The lowest 10 percent earned less than \$9.36 and the highest 10 percent earned more than \$20.78 an hour. Median hourly earnings in the industries employing the largest number of bus and truck mechanics and diesel engine specialists in 1997 were as follows:

Local government, except education and hospitals	\$16.90
Motor vehicles, parts, and supplies	14.10
Elementary and secondary schools	13.00
Trucking and courier services, except air	12.40
Automotive repair shops	12.30

Beginners usually earn from 50 to 75 percent of the rate of skilled workers and receive increases as they become more skilled, until they reach the rate of a skilled mechanic or service technician.

The majority of mechanics and service technicians work a standard 40-hour week, although some work as many as 70 hours per week,

particularly if they are self-employed. A growing number of shops have expanded their hours to better perform repairs and routine service when needed, or as a convenience to customers. Those employed by truck and bus firms providing service around the clock may work evenings, nights, and weekends. These technicians usually receive a higher rate of pay for working non-traditional hours.

Many diesel mechanics and service technicians are members of labor unions, including the International Association of Machinists and Aerospace Workers; the Amalgamated Transit Union; the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; the Transport Workers Union of America; the Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters.

Related Occupations

Diesel mechanics and service technicians repair trucks, buses, and other diesel-powered equipment. Related mechanic and technician occupations include aircraft mechanics, automotive mechanics and service technicians, boat engine mechanics, farm equipment mechanics, and mobile heavy equipment mechanics.

Sources of Additional Information

More details about work opportunities for diesel mechanics and service technicians may be obtained from local employers such as trucking companies, truck dealers, or bus lines; locals of the unions previously mentioned; and local offices of your State employment service. Local State employment service offices also may have information about training programs. State boards of postsecondary career schools also have information on licensed schools with training programs for diesel mechanics and service technicians.

For general information about a career as a diesel mechanic or service technician, write:

- ✉ American Trucking Associations, Inc., Maintenance Council, 2200 Mill Rd., Alexandria, VA 22314-4677.
- ✉ Kenworth Truck Company, Service Coordinator, 700 East Gate Dr., Suite 325, Mt. Laurel, NJ 08054.
- ✉ Detroit Diesel, Personnel Director, MS B39, 13400 West Outer Dr., Detroit, MI 48239.

Information on how to become a certified medium/heavy-duty diesel mechanic or bus mechanic is available from:

- ✉ ASE, 13505 Dulles Technology Dr., Herndon, VA 20171-3421. Internet: <http://www.asecert.org>

For a directory of accredited private trade and technical schools with training programs for diesel mechanics and service technicians, contact:

- ✉ Accrediting Commission of Career Schools and Colleges of Technology, 2101 Wilson Blvd., Suite 302, Arlington, VA 22201.
- ✉ National Automotive Technicians Education Foundation, 13505 Dulles Technology Dr., Herndon, VA 20171-3421. Internet: <http://www.natef.org>

For a directory of public training programs for diesel mechanics and service technicians, contact:

- ✉ SkillsUSA-VICA, P.O. Box 3000, 1401 James Monroe Hwy., Leesburg, VA 22075. Telephone: (toll free): 1-800-321-VICA. Internet: <http://www.skillsusa.org>

Farm Equipment Mechanics

(O*NET 85321)

Significant Points

- Skill in using computerized diagnostic equipment is becoming more important.
- Opportunities should be best for persons who complete post secondary programs in farm equipment or diesel mechanics.
- Jobs are concentrated in small towns and rural areas.